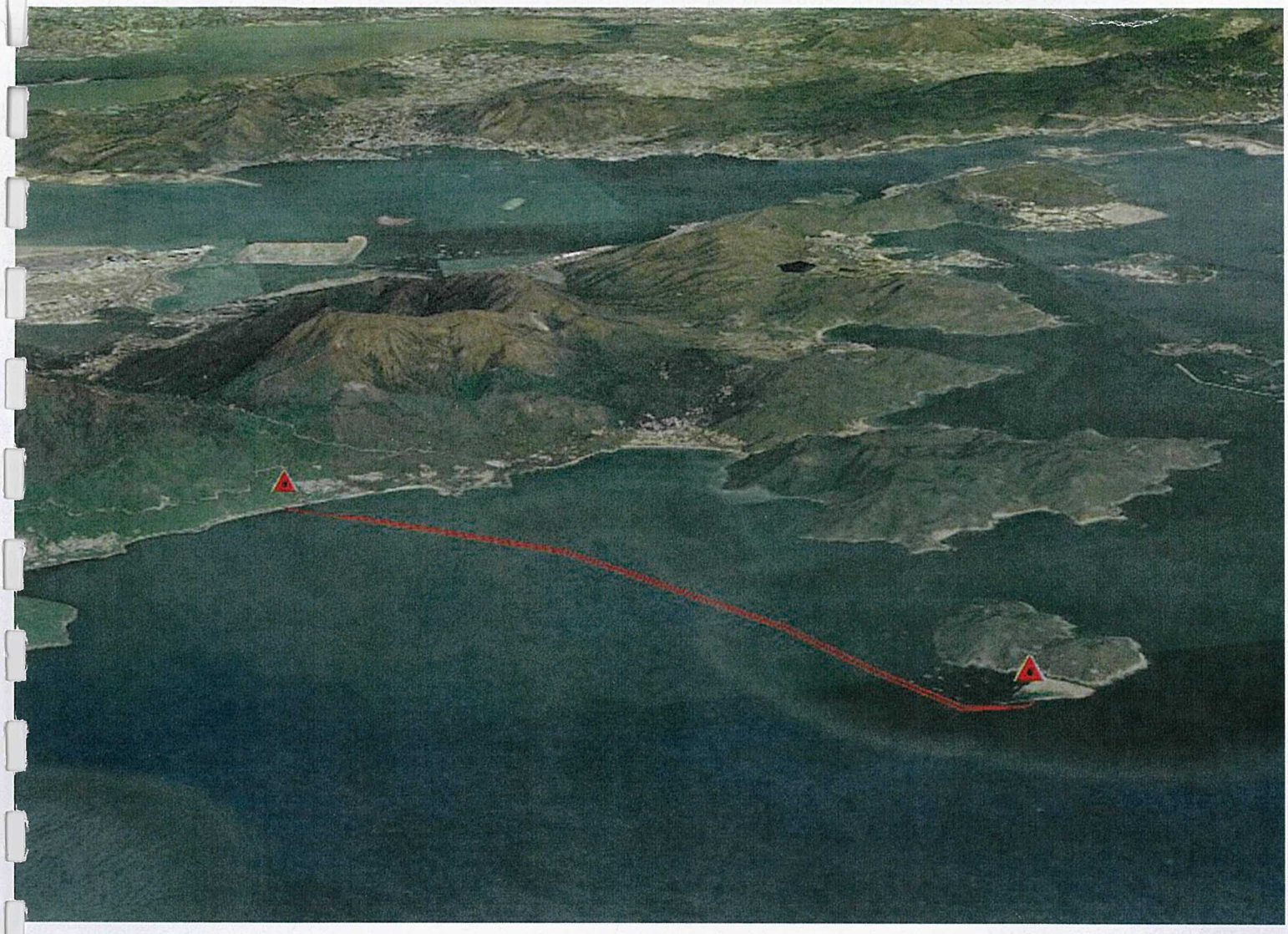

CLP Power

Submarine Cable for the Development of the Integrated Waste Management Facilities Phase 1

Updated Environmental Monitoring & Audit Manual

30 June 2023

Project No.: 0691230

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Submarine Cable for the Development of the Integrated Waste Management Facilities Phase 1
Environmental Certification Sheet
FEP-02/429/2012/B

Reference Document/Plan

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Reference EM&A Manual/ EP Requirement

EP Condition: Condition No. 3.1

Content: *Environmental Monitoring and Audit Requirements*

The EM&A programme shall be implemented in accordance with the procedures and requirements as set out in the EM&A Manual. Any changes to the EM&A requirements or programme shall be justified by the ET Leader and verified by the IEC as conforming to the relevant requirements set out in the EM&A Manual and shall seek the prior approval from the Director before implementation.

ET Certification

I hereby certify that the above referenced document/~~plan~~ complies with the above referenced condition of FEP-02/429/2012/B.

Ms Mandy TO,
Environmental Team Leader: Mandy To Date: 30 June 2023

IEC Verification

I hereby verify that the above referenced document/~~plan~~ complies with the above referenced condition of FEP-02/429/2012/B.

Ms Lemon Lam,
Independent Environmental Checker: Date: 30 June 2023

Signature Page

30 June 2023

Submarine Cable for the Development of the Integrated Waste Management Facilities Phase 1

Updated Environmental Monitoring & Audit Manual

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1. INTRODUCTION

1.1 Background

The Environmental Protection Department (EPD) of the Government of the Hong Kong Special Administrative Region (the Government) proposed to construct the Integrated Waste Management Facilities (IWMF) Phase 1 on an artificial island near Shek Kwu Chau (SKC), south of Lantau Island for the purpose of treating municipal solid waste and generating electricity from the waste treatment process for its own use and export surplus electricity, if any, to the power grid.

The EIA Report (EIA-201/2011) was approved by the EPD on 17 January 2012 with the Environmental Permit (EP) of the Project issued on 19 January 2012 (EP-429/2012) and a variation of the EP on 14 October 2016 (EP-429/2012/A). A Further EP (FEP-01/429/2012/A) was granted to Keppel Seghers-Zhen Hua Joint Venture for the reclamation works and construction of the IWMF on 27 December 2017. Another latest Further EP (FEP-02/429/2012/B) was granted to CLP Power for the installation of the 132kV submarine cable circuits connecting Cheung Sha, South Lantau and Shek Kwu Chau Artificial Island (the Project) on 25 May 2020. An Environmental Review Report (ERR) was prepared and approved to support the application of FEP-02/429/2012/B.

1.2 Purpose of the Manual

The purpose of this Environmental Monitoring and Audit (EM&A) Manual is to guide the setting up of an EM&A programme to ensure compliance with the recommendations of the Environmental Impact Assessment (EIA) Study and to assess the effectiveness of the recommended mitigation measures as well as to identify any further need for additional mitigation measures or remedial action. This Manual outlines the monitoring and audit programme for the cable installation and repair operation of the submarine cable for the IWMF Phase 1. It aims to provide systematic procedures for monitoring, auditing and minimizing environmental impacts associated with cable installation and repair operation.

Hong Kong environmental regulations and the Hong Kong Planning Standards and Guidelines have served as environmental standards and guidelines in the preparation of this Manual. In addition, the EM&A Manual has been prepared in accordance with the requirements stipulated in Annex 21 of the Technical Memorandum on the EIA Process (EIAO-TM).

This Manual contains the following information:

- responsibilities of the Contractor, the Employer's Representative (ER), the Independent Consultants (IC), Environmental Team (ET), the Independent Environmental Checker (IEC), EIAO Authority of Environmental Protection Department (EPD) with respect to the environmental monitoring and audit requirements during the course of the Project;
- project organization for the Project;
- the basis for, and description of the broad approach underlying the EM&A programme;
- requirements with respect to the construction programme schedule and the necessary environmental monitoring and audit programme to track the varying environmental impact;
- details of the methodologies to be adopted, including all field laboratories and analytical procedures, and details on quality assurance and quality control programme;
- definition of action and limit levels;
- establishment of event and action plans;
- requirements for reviewing pollution sources and working procedures required in the event of non-compliance with the environmental criteria and complaints;
- requirements for presentation of environmental monitoring and audit data and appropriate reporting procedures; and

- requirements for review of EIA predictions and the effectiveness of the mitigation measures / environmental management systems and the EM&A programme.

For the purpose of this manual, the ET leader, who shall be responsible for and in charge of the ET, shall refer to the person delegated the role of executing the EM&A requirements.

1.3 Project Description

1.3.1 Introduction

The Project is to install the 132kV submarine cable circuits connecting Cheung Sha, South Lantau and Shek Kwu Chau Artificial Island for exporting surplus electricity from IWMF to the power grid, and maintain and repair the submarine cable during the operational phase, if necessary.

1.3.2 Project Location

The alignment of the submarine cable route is shown in **Figure 1.1**. The proposed cable would land at the landing portal at Upper Cheung Sha Beach.

1.3.3 Scope of Project

The Project is mainly to construct submarine cables for exporting surplus electricity to the power grid, and maintain and repair the submarine cable during the operational phase, if necessary. The submarine cables would be installed by burying method using water jets. A cable burying machine would include an injector lowered to the seabed. The injector fluidizes a trench using high pressure water jets and a cable is immediately laid within the trench. The sides of the trench slip around the cable, burying it and leaving a small depression in the seabed.

1.4 Construction Programme

The tentative construction programme for the submarine cable is shown in **Table 1.1**.

Table 1.1 Tentative Construction Programme of Submarine Cable

Description	Tentative Programme
Preparation on Upper Cheung Sha Beach/ IWMF Artificial Island	Mid Sep 2023
Land works commence	Early Oct 2023
Marine works commence	Early Nov 2023
Cable laying barge works completion	End Nov 2023
Completion of submarine cable protection	End Feb 2024
Completion of works on beach / IWMF Artificial Island	End Mar 2024

1.5 Project Organization

1.5.1 Introduction

The roles and responsibilities of the various parties involved in the cable installation and repair operation of the EM&A process and the implementation of the EM&A programme are outlined below. The proposed project organization and lines of communication during cable installation with respect to environmental protection works are shown in **Figure 1.2**.

1.5.2 Construction Phase (Cable Installation)

Employer's Representative

The term "Employer's Representative (ER)" refers to the organization responsible for overseeing the construction works of the Project undertaken by the Contractor, and for ensuring that they are

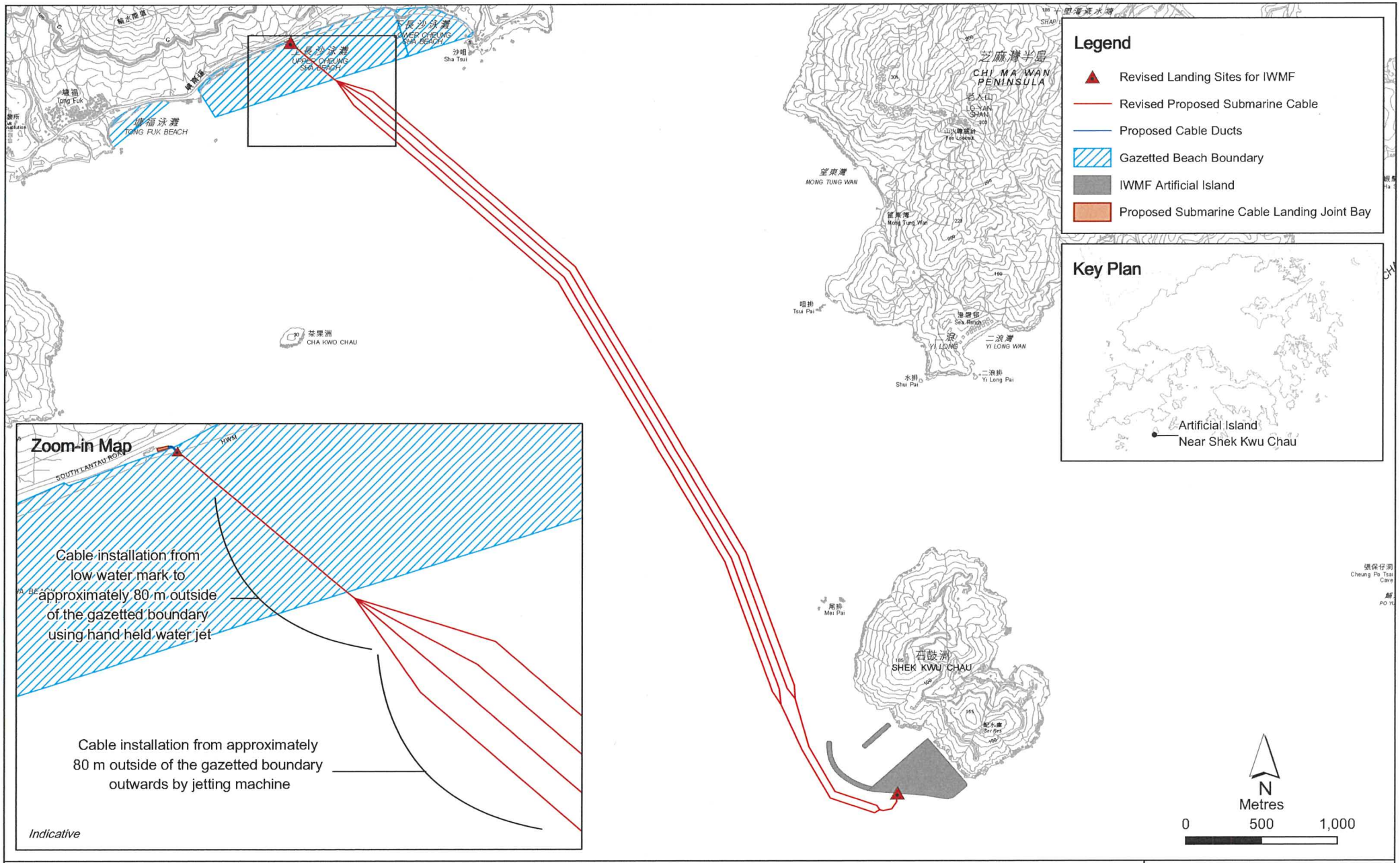

Figure 1.1

Alignment of the Submarine Cable for the Development of the Integrated Waste Management Facilities

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Environmental Resources Management

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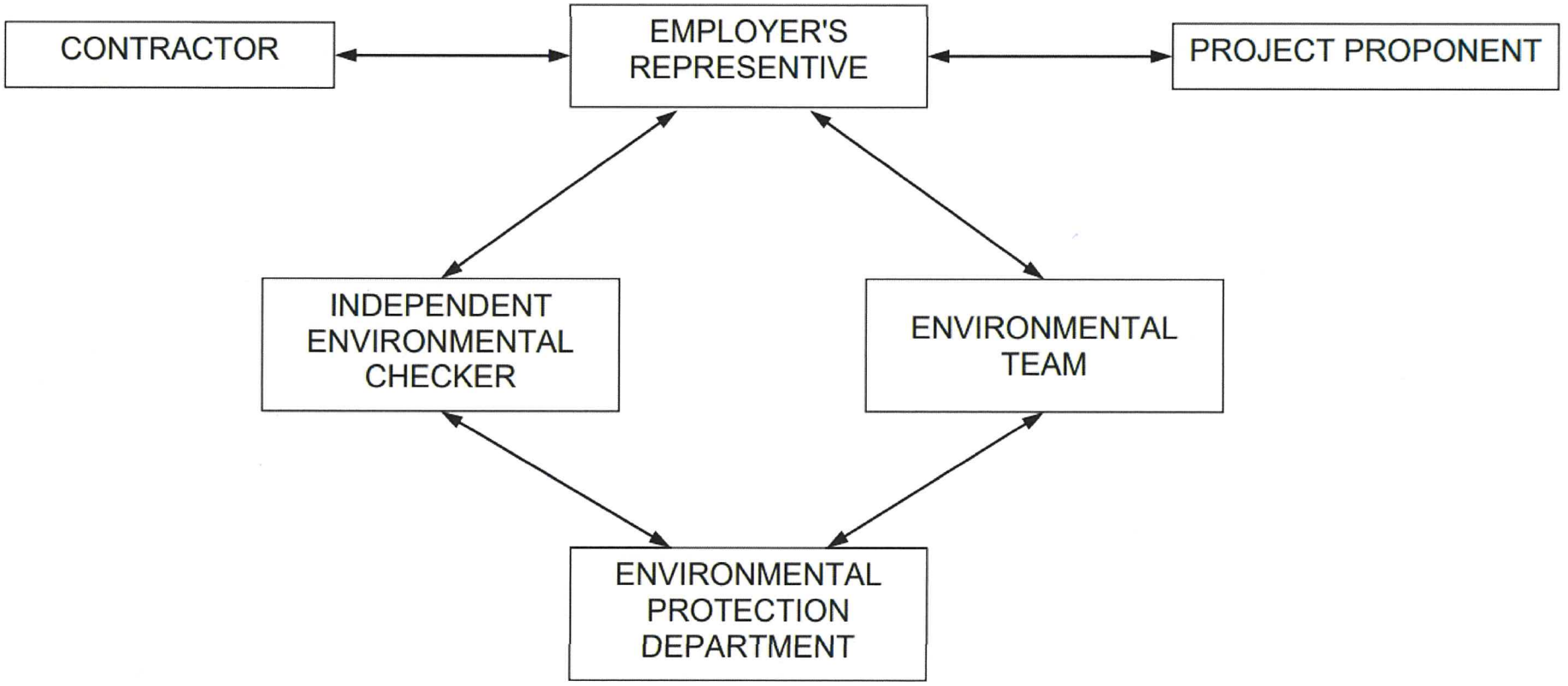


Figure 1.2

Project Organization - EM&A Programme For Construction Phase

Environmental Resources Management

ERM

undertaken by the Contractor in accordance with the specification and contractual requirements. The responsibilities of the ER include the followings:-

- Monitor the Contractor's compliance with contract specifications, including the implementation and operation of the environmental mitigation measures and ensure their effectiveness, and other aspects of the EM&A programme;
- Monitor the Contractor's, the ET's and the IEC's compliance and ensure that the requirements in the Environmental Permit (EP) and EM&A Manual are fully complied with;
- Provide assistance to the ET as necessary in the implementation of the EM&A programme;
- Participate in joint site inspection undertaken by the ET and the IEC;
- Comply with the agreed Event / Action Plan in the event of any exceedance; and
- Adhere to the procedures for carrying out complaint investigation.

Contractor

The term "Contractor" should be taken to mean all construction contractors and sub-contractors, working on site at any one time. Besides reporting to the ER, the Contractor should also be responsible for the following tasks:

- Work within the scope of the relevant contract and other tender conditions;
- Provide assistance to the ET in carrying out monitoring;
- Participate in the site inspections undertaken by the ET as required, and undertake any corrective actions;
- Provide information / advice to the ET regarding works activities which may contribute, or be continuing to the generation of adverse environmental conditions;
- Submit proposals on mitigation measures in case of exceedances of action or limit levels in accordance with the event / action plans;
- Implement measures to reduce impact where action or limit levels are exceeded; and
- Adhere to the procedures for carrying out complaint investigation.

Independent Environmental Checker (IEC)

The Independent Environmental Checker (IEC) should not be in any way an associated body of the Contractor for the Project. The responsibilities of the IEC should include the followings:-

- Advise the ER on environmental issues related to the project, independent from the management of cable installation works, but empowered to audit the environmental performance of submarine cable installation;
- Provide proactive advice to the ER and the Employer of the Project on environmental matters;
- Review and audit all aspects of the EM&A programme, including the implementation of environmental mitigation measures, submission relating to the EP and EM&A, and any other submission required under the EP and EM&A Manual;
- Review and verify the monitoring data and all submissions relating to or under the EP and EM&A Manual submitted by the ET, including but not limited to the EM&A reports;
- Monitor the implementation of the EM&A programme and the overall level of environmental performance being achieved;
- Arrange and conduct regular, at least monthly site inspections of the works during cable installation, and ad hoc inspections if significant environmental problems are identified;
- Comply with the agreed event / action plan in the event of any exceedance;

- Check and ensure the procedures for carrying out complaint investigation being followed and check the effectiveness of corrective measures;
- Feedback audit results to ET by signing off relevant EM&A proforma;
- Ensure the impact monitoring is conducted at the correct locations at the frequency identified in the EM&A Manual;
- Check that the mitigation measures are effectively implemented; and
- Report the works conducted, the findings, recommendation and improvement of the site inspections, the findings, recommendation, and improvement after reviewing the ET's and the Contractor's works, and any advices to the ER and the Employer of the Project on a monthly basis.

Environmental Team

The ET shall not be in any way an associated body of the Contractor, and shall be responsible to conduct the EM&A programme. The ET should be managed by the ET Leader. The ET Leader shall be a person who has at least 7 years' experience in EM&A and have relevant professional qualifications. Suitably qualified staff should be included in the ET, and resources for the implementation of the EM&A programme should be allocated in time under the Contract, to enable fulfilment of the Project's EM&A requirements as specified in the EM&A Manual during cable installation of the Project. The ET shall report to the ER and the duties of ET shall include the followings:-

- Monitor and audit various environmental parameters as required in this EM&A Manual;
- Analyse the environmental monitoring and audit data and review the success of EM&A programme to cost-effectively confirm the adequacy of mitigation measures implemented and the validity of the EIA predictions and to identify any adverse environmental impacts arising;
- Carry out regular site inspection to investigate and audit the Contractor's site practice, equipment and work methodologies with respect to pollution control and environmental mitigation, and effect proactive action to pre-empt problems;
- Monitor compliance with conditions in the EP, environmental protection, pollution prevention and control regulations and contract specifications;
- Audit environmental monitoring data and site environmental conditions;
- Report on the environmental monitoring and audit results to EPD, the ER, the IEC and Contractor or their delegated representative;
- Recommend suitable mitigation measures to the Contractor in the case of exceedance of action or limit levels in accordance with the event and action plans;
- Liaise with the IEC on all environmental performance matters and timely submit all relevant EM&A proforma for approval by the IEC;
- Advise the Contractor on environmental improvement, awareness, enhancement matters, etc. on site;
- Adhere to the procedures for carrying out complaint investigation; and
- Timely submit the EM&A Reports to EPD.

Sufficient and suitably qualified professional and technical staff should be employed to ensure full compliance with their duties and responsibilities, as required under the EM&A programme during cable installation of the Project.

1.5.3 Operational Phase (Repair Operation)

The ER will be responsible to monitor the Contractor's compliance with contract specifications, including the implementation and operation of the environmental mitigation measures. The contractor will be responsible to implement mitigation measures as outlined in **Appendix A** as far as practicable.

1.6 Structure of this Manual

Following this introductory section, the structure of the EM&A Manual is set out below:-

- Section 2 sets out the EM&A requirements for air quality;
- Section 3 sets out the EM&A requirements for noise;
- Section 4 details the EM&A requirements for water quality baseline and impact monitoring, and lists relevant monitoring equipment, compliance and Event and Action Plans (EAPs);
- Section 5 sets out the EM&A requirements for waste management;
- Section 6 details the EM&A requirements for ecology;
- Section 7 sets out the EM&A requirements for fisheries;
- Section 8 sets out the EM&A requirements for health;
- Section 9 sets out the EM&A requirements for landscape and visual;
- Section 10 sets out the EM&A requirements for cultural heritage;
- Section 11 details the requirements on site environmental audit and the environmental complaints handling procedure; and
- Section 12 details the EM&A reporting requirements

2. AIR QUALITY IMPACT

The EIA Study concluded that no adverse fugitive dust impact associated with the installation and repair operation of the submarine cable is anticipated. No specific environmental monitoring and audit (EM&A) requirements related to air are required during cable installation and repair operation.

3. NOISE IMPACT

The EIA Study concluded that no adverse noise impact associated with the installation and repair operation of the submarine cable is anticipated. No specific environmental monitoring and audit (EM&A) requirements related to noise are required during cable installation and repair operation.

4. WATER QUALITY IMPACT

4.1 Introduction

Potential impacts on water quality associated with the submarine cable installation/ repair operation have been identified and mitigation measures have been recommended, including limiting the speed of the cable installation barge, using silt curtains where appropriate and undertaking a water quality monitoring programme. The following Section provides details of the water quality monitoring during the installation of the submarine cable. If repair operation of the cable is required, mitigation measures proposed for the cable installation as outlined in **Appendix A** will be implemented as far as practicable.

4.2 Water Quality Parameters

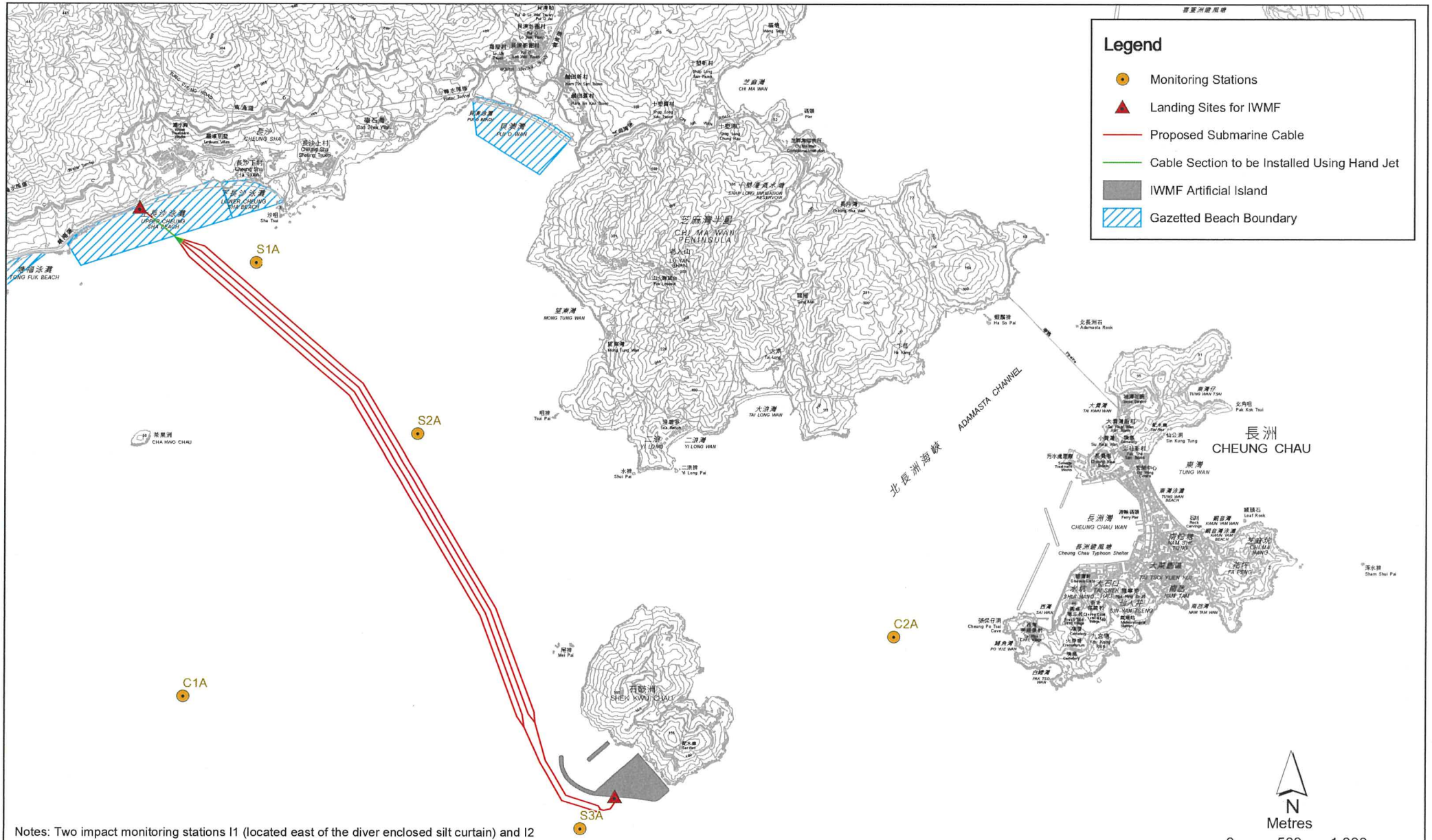
Dissolved oxygen (DO), salinity, turbidity and suspended solids (SS) levels shall be monitored at designated marine water quality monitoring stations before, during and after the marine works for submarine cable laying. The levels of DO, pH, salinity, temperature, and turbidity should be measured in situ whereas SS should be determined by laboratory.

4.3 Monitoring Locations

The proposed water quality monitoring stations for submarine cable installation are shown in **Table 4.1** and **Figure 4.1**. The majority of the proposed locations for monitoring stations have already been updated and used in existing water quality monitoring exercise conducted under FEP-01/429/2012/A and is therefore deemed accessible and suitable. Nevertheless, in case status and locations of water sensitive receivers and the marine activities change after issuing this Manual, the ET Leader shall propose updated monitoring locations and seek approval from the IEC and EPD.

Marine water quality monitoring stations have been proposed at different water quality sensitive receivers to monitor the water quality impact due to the proposed marine works under this Project. Water quality monitoring at the northern landing site, midway and southern landing site of the proposed submarine cable is proposed at monitoring stations S1, S2 and S3 for monitoring the SS impact due to the laying of submarine cable. These monitoring stations were replaced as S1A, S2A and S3A in response to the updated cable alignment. Control stations C1 and C2 have been proposed under the approved EIA at far field location for comparison. Under FEP-01/429/2012/A, the locations of monitoring stations of C1 and C2 have been replaced as C1A and C2A according to recommendations from stakeholders.

In addition to all monitoring stations from the original EM&A manual of the approved EIA as well as the updated locations under FEP-01/429/2012/A, two additional monitoring locations I1 and I2 have been included in response to the change in cable alignment and landing point to the gazetted beach of Upper Cheung Sha under FEP-02/429/2012/B. Location of Monitoring Stations I1 and I2 should be chosen to be at around 20 m away from the diver enclosed silt curtain where active diver hand jetting



Notes: Two impact monitoring stations I1 (located east of the diver enclosed silt curtain) and I2 (located to the west of the diver enclosed silt curtain) will be monitored whenever hand jetting works conducted by diver within the gazetted boundary of Upper Cheung Sha Beach

Figure 4.1

Locations of Water Quality Monitoring Stations for Construction Phase Impact Monitoring

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Environmental Resources Management

ERM

would be conducted. Station I1 should be located to the east of the diver enclosed silt curtain and I2 should be located to the west of the diver enclosed silt curtain. These two stations should be monitored whenever hand jetting works would be conducted by diver within the gazetted boundary of Upper Cheung Sha Beach. These stations do not need to be monitored during the baseline and post-construction monitoring.

Table 4.1 Proposed Marine Water Quality Stations for Baseline and Impact Monitoring during Construction Phase

Station	Description	Easting	Northing
Regular Monitoring Stations			
C1A#	Control Station	812823	806300
C2A#	Control Station	818869	806808
S1A#	Submarine Cable Landing Site	813430	809962
S2A#	Submarine Cable	814808	808515
S3A#	Submarine Cable Landing Site	816203	805178
Beach Water Quality Monitoring Stations (only for Impact Monitoring)			
I1	Impact Station within gazetted boundary of Upper Cheung Sha Beach – East of Diver Enclosed Silt Curtain	Varies	Varies
I2	Impact Station within gazetted boundary of Upper Cheung Sha Beach – West of Diver Enclosed Silt Curtain	Varies	Varies

Note: # Updated monitoring stations

Sampling for baseline and impact monitoring shall be taken at three water depths, namely, 1m below water surface, mid-depth and 1m above seabed, except at where the water depth is less than 6m, in which case the mid-depth station may be omitted. Shall the water depth be less than 3m, only the mid-depth station will be monitored.

4.4 Baseline Monitoring

Baseline conditions for marine water quality should be established and agreed with EPD prior to the commencement of marine works for submarine cable laying. The purpose of the baseline monitoring is to establish ambient conditions prior to the commencement of the marine works for submarine cable laying and to demonstrate the suitability of the proposed monitoring stations.

The baseline conditions should be established by measuring suspended solids (SS), salinity, turbidity and dissolved oxygen (DO) levels at the selected monitoring stations as shown in **Table 4.1**. The baseline monitoring schedule should be submitted to EPD at least 4 weeks before commencement of monitoring for agreement. EPD should also be notified immediately for any changes in schedule.

The measurements should be taken at all designated monitoring stations, 3 days per week, at mid-flood and mid-ebb tides, for at least 4 weeks prior to the commencement of marine works. There should not be any marine construction activities in the vicinity of the stations during the baseline monitoring. The interval between 2 sets of monitoring should not be less than 36 hours. Duplicate in-situ measurements and water sampling should be carried out in each sampling event.

As the cable installation/ repair works will be conducted within a short period of time, no dry season and wet season monitoring for baseline monitoring is considered necessary.

The baseline monitoring report should be submitted to EPD at least 2 weeks before the commencement of works for agreement. The baseline monitoring report should be certified by the ET Leader and verified by IEC before submission to EPD.

4.5 Construction Phase Impact Monitoring

The majority of the cable alignment would be installed using jetting machine. For the landing point at the Upper Cheung Sha Beach, no work would be conducted in the bathing season from April to October. Furthermore, cable laying with jetting machine will be avoided for cable section 80 m away from the gazetted boundary of Upper Cheung Sha to minimize SS impact on the gazetted beach of Upper Cheung Sha.

During marine works for cable installation/ laying (including by diver hand jetting near the northern end or by jetting machine for the rest of the cable alignment), monitoring should be undertaken three days per week, at mid-flood and mid-ebb tides, with sampling / measurement at the designated monitoring stations as shown in **Table 4.2**. Upon completion of cable installation works by both jetting machine and diver, the monitoring exercise at the designated monitoring locations should be continued for four weeks in the same manner as the baseline monitoring for post project monitoring.

The interval between two sets of monitoring should not be less than 36 hours except where there are exceedances of Action and/or Limit Levels, in which case the monitoring frequency will be increased. **Table 4.2** shows the proposed monitoring frequency and water quality parameters. Duplicate *in-situ* measurements and water sampling should be carried out in each sampling event. The monitoring probes should be retrieved out of water after the first measurement and then redeployed for the second measurement. Where the difference in value between the first and second readings of DO or turbidity is more than 25% of the value of the first reading, the reading should be discarded and further readings should be taken.

The proposed water quality monitoring schedule should be submitted to EPD at least 1 week before the first day of the monitoring month. EPD should also be notified immediately for any changes in schedule. If the monitoring data collected at the designated stations indicate that the Action or Limit Levels as shown in **Table 4.4** are exceeded, appropriate actions should be taken in accordance with the Event and Action Plan in **Table 4.5**.

Table 4.2 Proposed Marine Water Quality Monitoring Frequency and Parameters for Construction Phase Monitoring

Activities	Monitoring Frequency	Key Parameters [Note 1]	Monitoring Stations
During the 4-week baseline monitoring period	Three days per week, at mid-flood and mid-ebb tides	Suspended Solids (SS), Turbidity and Dissolved Oxygen (DO)	C1A, C2A, S1A, S2A, S3A
During marine works for installation of submarine cables outside the gazetted boundary of Upper Cheung Sha Beach	Three days per week, at mid-flood and mid-ebb tides	Suspended Solids (SS), Turbidity and Dissolved Oxygen (DO)	C1A, C2A, S1A, S2A, S3A,
During hand jetting works conducted by diver within the gazetted boundary of Upper Cheung Sha Beach	Three days per week during hand jetting works	Suspended Solids (SS), Turbidity and Dissolved Oxygen (DO)	C1A, C2A, I1, I2
During a 4-week period after completion of marine works	Three days per week, at mid-flood and mid-ebb tides	Suspended Solids (SS), Turbidity and Dissolved Oxygen (DO)	C1A, C2A, S1A, S2A, S3A

Notes: 1. DO and turbidity should be measured *in situ* whereas SS should be determined by laboratory analysis.

4.6 Field Log

Other relevant data should also be recorded, including monitoring location / position, time, water depth, sampling depth, pH, salinity, DO saturation, water temperature, tidal stages, weather conditions and any special phenomena or work underway nearby.

A sample data record sheet is shown in **Appendix B** for reference.

4.7 Monitoring Equipments

4.7.1 Dissolved Oxygen and Temperature Measuring Equipment

The instrument should be a portable and weatherproof DO measuring instrument complete with cable and sensor, and use a DC power source. The equipment should be capable of measuring:

- a DO level in the range of 0 - 20 mg/L and 0 - 200% saturation; and
- a temperature of 0 - 45 degree Celsius.

4.7.2 Turbidity Measurement Instrument

The instrument should be a portable and weatherproof turbidity-measuring instrument using a DC power source. It should have a photoelectric sensor capable of measuring turbidity between 0 – 1000 NTU (for example, Hach model 2100P or an approved similar instrument).

4.7.3 pH Measurement Instrument

The instrument should consist of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device. It should be readable to 0.1pH in a range of 0 to 14. Standard buffer solutions of at least pH 7 and pH 10 should be used for calibration of the instrument before and after use.

4.7.4 Sampler

A water sampler is required. It should comprise a transparent PVC cylinder, with a capacity of not less than 2 litres, which can be effectively sealed with latex cups at both ends. The sampler should have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth (for example, Kahlsico Water Sampler or an approved similar instrument).

4.7.5 Water Depth Detector

A portable, battery-operated echo sounder should be used for the determination of water depth at each designated monitoring station. This unit can either be hand held or affixed to the bottom of the work boat, if the same vessel is to be used throughout the monitoring programme.

4.7.6 Salinity

A portable salinometer capable of measuring salinity in the range of 0 – 40 parts per thousand (ppt) shall be provided for measuring salinity of the water at each monitoring location.

4.7.7 Sample Containers and Storage

Water samples for SS and three heavy metals measurements should be stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen) and delivered to the laboratory and analysed as soon as possible after collection. Sufficient volume of samples should be collected to achieve the detection limit stated in **Section 4.8**.

4.7.8 Monitoring Position Equipment

A hand-held or boat-fixed type digital Differential Global Positioning System (DGPS) with way point bearing indication and Radio Technical Commission for maritime (RTCM) Type 16 error message 'screen pop-up' facilities (for real-time auto-display of error messages and DGPS corrections from the Hong Kong Hydrographic Office), or other equipment instruments of similar accuracy, should be provided and used to ensure that the water sampling locations are correct during the water quality monitoring work.

4.7.9 Calibration of In-Situ Instruments

The DO meter and turbidimeter should be checked and calibrated before use. DO meter and turbidimeter should be certified by a laboratory accredited under HOKLAS or any other international accreditation scheme, and subsequently re-calibrated at three monthly intervals throughout all stages of the water quality monitoring. Responses of sensors and electrodes should be checked with certified standard solutions before each use. Wet bulb calibration for a DO meter should be carried out before measurement at each monitoring location.

Sufficient stocks of spare parts should be maintained for replacements when necessary. Backup monitoring equipment should also be made available so that monitoring can proceed uninterrupted even when some equipment is under maintenance, calibration, etc.

4.8 Laboratory Measurement / Analysis

Analysis of suspended solids (SS) should be carried out in a HOKLAS or other international accredited laboratory. Sufficient water samples should be collected at the monitoring stations for carrying out the laboratory determinations. The determination work should start within 24 hours after collection of the water samples. The analyses should follow the American Public Health Association (APHA) Standard Methods for the Examination of Water and Wastewater or an equivalent method subject to the approval of EPD. The suggested testing method and lowest detection limit are provided in **Table 4.3**.

Table 4.3 Analytical Methods to be Applied to Marine Water Quality Samples

Determinant	Standard Method	Detection Limit
Suspended Solids (mg/L)	APHA 2540D*	1 mg/L

Notes: * APHA American Public Health Association Standard Methods for the Examination of Water and Wastewater

The testing of SS should be HOKLAS accredited (or if not, approved by EPD) and comprehensive quality assurance and control procedures in place in order to ensure quality and consistency in results.

Detailed testing methods, pre-treatment procedures, instruments use, Quality Assurance / Quality Control (QA/QC) details (such as blank, number of duplicate samples per batch, etc.), detection limit and accuracy shall be submitted to EPD for approval prior to the commencement of monitoring programme. EPD may also request the laboratory to carry out analysis of known standards provided by EPD for quality assurance. The QA/QC shall be in accordance with the requirements of HOKLAS or international accredited scheme. The QA/QC results shall be reported. The testing methods and related proposal should be checked and certified by IEC before submission to EPD for approval.

Additional duplicate samples may be required by EPD for inter laboratory calibration. If in-house or non-standard methods are proposed, details of the method verification may also be required by EPD. In any circumstance, the sample testing should have comprehensive quality assurance and quality control programmes. The laboratory should prepare to demonstrate the programmes to EPD or EPD's representatives when requested.

4.9 Event and Action Plan

The water quality assessment criteria, namely Action and Limit levels are shown in **Table 4.4**. If the monitoring results of the water quality parameters at any designated monitoring stations indicate that the water quality assessment criteria are exceeded during cable installation, the actions in accordance with the Event and Action Plan in **Table 4.5** should be carried out.

Table 4.4 Action and Limit Levels for Marine Water Quality

Parameters	Action	Limit
Construction Phase Impact Monitoring		
DO in mg/L	≤ 5 %-ile of baseline data	≤ 4 mg/L
SS in mg/L	≥ 95 %-ile of baseline data or 120% of control station's SS at the same tide of the same day of measurement	≥ 99 %-ile of baseline or 130% of control station's SS at the same tide of the same day of measurement
Turbidity in NTU	≥ 95 %-ile of baseline data or 120% of control station's turbidity at the same tide of the same day of measurement	≥ 99 %-ile of baseline or 130% of control station's turbidity at the same tide of the same day of measurement

Notes:

1. For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
2. For SS and turbidity, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

If monitoring results indicate that the cable installation works have caused an adverse impact on water quality at the water sensitive receivers, an additional mitigation measures should be recommended to rectify the non-compliance or the construction programme / design should be carefully reviewed.

4.10 Mitigation Measures

Mitigation measures for water quality control have been recommended in the EIA Report and the ERR. The Contractor should be responsible for the design and implementation of these measures.

Recommended mitigation measures to minimize the adverse impacts on water quality are listed in the implementation schedule given in **Appendix A**.

Table 4.5 Event and Action Plan for Construction Phase Marine Water Quality

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action level being exceeded by one sampling day	Repeat in-situ measurement to confirm findings; Identify source(s) of impact; Inform IEC and Contractor; Check monitoring data, all plant, equipment and	Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;	Discuss with IEC on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented. (The above actions should be taken within 1 working day after	Inform the ER and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment;

	Contractor's working methods; Discuss mitigation measures with IEC and Contractor; (The above actions should be taken within 1 working day after the exceedance is identified) Repeat measurement on next day of exceedance.	Assess the effectiveness of the implemented mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)	the exceedance is identified)	Consider changes of working methods; Discuss with ET and IEC and propose mitigation measures to IEC and ER within 3 working days; Implement the agreed mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)
Action level being exceeded by more than one consecutive sampling days	Identify source(s) of impact; Inform IEC and Contractor; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC and Contractor; Ensure mitigation measures are implemented; Prepare to increase the monitoring frequency to daily; (The above actions should be taken within 1 working day after the exceedance is identified) Repeat measurement on next working day of exceedance.	Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; Assess the effectiveness of the implemented mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)	Discuss with IEC on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)	Inform the ER and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET and IEC and propose mitigation measures to IEC and ER within 3 working days; Implement the agreed mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)

Limit level being exceeded by one sampling day	Repeat in situ measurement to confirm findings; Check monitoring data, plant, equipment and Contractor's working methods; Identify source(s) of impact and record in notification of exceedance; Inform IEC, Contractor and EPD; Discuss mitigation measure with IEC, ER and Contractor; (The above actions should be taken within 1 working day after the exceedance is identified) Repeat measurement on next day of exceedance.	Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; Assess the effectiveness of the implemented mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)	Discuss with IEC, ET and Contractor on the proposed mitigation measures; Request Contractor to critically review the working methods; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)	Inform the ER and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days; Implement the agreed mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)
Limit level being exceeded by more than one consecutive sampling days	Identify source(s) of impact; Inform IEC, contractor and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC, ER and Contractor; Ensure mitigation measures are implemented; Increase the monitoring frequency to daily	Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; Assess the effectiveness of the implemented mitigation measures. (The above actions should be taken within 1 working day after	Discuss with IEC, ET and Contractor on the proposed mitigation measures; Request Contractor to critically review the working methods; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures;	Inform the ER and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET , IEC and ER and propose mitigation measures to IEC and ER within 3 working days;

	until no exceedance of Limit level for two consecutive days. (The above actions should be taken within 1 working day after the exceedance is identified)	the exceedance is identified)	Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the marine work until no exceedance of Limit level. (The above actions should be taken within 1 working day after the exceedance is identified)	Implement the agreed mitigation measures; As directed by the ER, to slow down or to stop all or part of the marine work or construction activities. (The above actions should be taken within 1 working day after the exceedance is identified)

5. WASTE MANAGEMENT IMPLICATIONS

The EIA Study concluded that no adverse waste management implications associated with the installation and repair operation of the submarine cable is anticipated. No specific environmental EM&A requirements related to waste management are required during cable installation and repair operation. General mitigation measure as outlined in Table 1.2 of **Appendix A** will be implemented as far as practicable.

6. ECOLOGICAL IMPACT

6.1 Introduction

The EIA report and ERR have identified the proposed Project Site as an important habitat for Finless Porpoise. The cable installation/ repair operation works will be short-term and temporary. No unacceptable adverse impacts to marine mammals (Finless Porpoises and Chinese White Dolphin) from underwater sounds or other Project impacts are expected to occur from cable installation.

However, additional precautionary measure will be implemented for marine mammals during the cable installation works and as required during cable repair operations. This section describes the specific precautionary measures recommended for Finless Porpoise.

6.2 Ecological Mitigation Measures

6.2.1 Marine Mammal Exclusion Zone

During submarine cable installation/ repair operation works (outside of the gazetted boundary of the Upper Cheung Sha Beach using vessel and jetting machine) taking place in daylight hours along the landing sites between Shek Kwu Chau and Cheung Sha Beach, a marine mammal exclusion zone of 250 m radius from the cable installation/ repair vessel is recommended to be implemented as a precautionary measure to reduce disturbance to marine mammals, especially the Finless Porpoise.

Two marine mammal observers will be deployed to conduct the observation. The marine mammal observer should be well trained to detect marine mammals. The observers will stand on the open upper decks of the cable installation/repair operation vessel, allowing for observer eye heights of 4 to 5 m above water level and relatively unobstructed 180° visibility. Vessel-based observation by the observer(s) shall be conducted by searching a 180° swath where the installation works are being

conducted at the centre, with appropriate marine binoculars, scanning the same area with the naked eyes and occasional binocular check.

The exclusion zone should be closely monitored by an experienced marine mammal observer at least 30 minutes before the start of cable installation/ repair operation works using vessel and jetting machine. If a marine mammal is noted within the exclusion zone, all marine works should stop immediately and remain idle for 30 minutes, or until the exclusion zone is free from marine mammals. This measure will confirm that the area in the vicinity of the cable installation is clear of marine mammals prior to the commencement of works and will serve to reduce any disturbance to marine mammals.

During cable installation using vessel and jetting machine, if marine mammals are spotted within the exclusion zone, cable installation works will cease and will not resume until the observer confirms that the zone has been continuously clear of marine mammals for a period of 30 minutes.

In addition, as marine mammals cannot be effectively monitored within the proposed monitored exclusion zone at night, or during adverse weather conditions (i.e. Beaufort 5 or above, visibility of 300 meters or below), marine works should be avoided under weather conditions with low visibility.

6.2.2 *Adoption of regular travel route*

In order to minimize the disruption on marine mammal's behavioural pattern during cable installation and repair operation, captains of all vessels should adopt regular travel route, in order to minimize the chance of vessel collision with marine mammals, which may otherwise result in damage to health or mortality.

The regular travel route should avoid areas with high sighting density of Finless Porpoise as much as possible. With the adoption of regular travel route, potential alteration in behavioural pattern of marine mammals due to increase in marine traffic is considered to be acceptable.

6.2.3 *Vessel speed limit*

In order to minimise potential injury and mortality of marine mammals due to collision with vessels during construction (working vessels) and potential repair operation works, a speed limit of ten knots (ie 18.5 km hr^{-1}) should be strictly enforced within the works areas and within areas with high density of Finless Porpoises.

7. FISHERIES IMPACT

The EIA Study and ERR concluded that no adverse fisheries impact associated with the installation and repair operation of the submarine is anticipated. No specific environmental monitoring and audit (EM&A) requirements related to fisheries impact are required during cable installation and repair operation.

8. HEALTH IMPACT

The EIA Study concluded that no adverse health impact associated with the installation and repair operation of the submarine cable is anticipated. No specific environmental monitoring and audit (EM&A) requirements related to health impact are required during cable installation and repair operation.

9. LANDSCAPE AND VISUAL IMPACT

The EIA Study concluded that no adverse landscape and visual impact associated with the installation and repair operation of the submarine cable is anticipated. No specific environmental monitoring and

audit (EM&A) requirements related to landscape and visual impact are required during cable installation and repair operation.

10. IMPACT ON CULTURAL HERITAGE

The EIA Study concluded that no adverse impact on cultural heritage associated with the installation and repair operation of the submarine cable is anticipated. No specific environmental monitoring and audit (EM&A) requirements related to impact on cultural heritage are required during cable installation and repair operation.

11. SITE ENVIRONMENTAL AUDIT & ENVIRONMENTAL COMPLAINTS

11.1 Site Inspection

Site inspection provides a direct means to initiate and enforce specified environmental protection and pollution control measures. These should be undertaken routinely to inspect construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. The site inspection is one of the most effective tools to enforce the environmental protection requirements at the works area.

The ET Leader should be responsible for formulating the environmental site inspection, the deficiency and action reporting system, and for carrying out the site inspection works. He / she should submit a proposal for site inspection and deficiency and action reporting procedures to the Contractor for agreement, and to the ER for approval. The ET's proposal for rectification would be made known to the IEC.

Weekly site inspection by ET will be undertaken at the landing point (ie from High Water Mark (HWM) to Cable Joint Bay) at Upper Cheung Sha Beach during cable installation in this area to ensure that appropriate environmental protection and precautionary measures are properly implemented, in particular keeping Upper Cheung Sha Beach in a safe and environmentally friendly condition for the general public, as well as ensuring no hazard to the public due to the Project. The areas of inspection should not be limited to the environmental situation, pollution control and mitigation measures within the site, the site inspections should also review the environmental situation outside the works area which is likely to be affected, directly or indirectly, by the site activities. The ET Leader should ensure the following be implemented in conducting the inspection:-

<u>Prior to Cable Installation at Land and Shore-End</u>

i. In order to minimise the risk of disturbance to the existing utilities, the Contractor should confirm the location of all the utilities within the works area with the relevant departments, for example, but not limited to, Drainage Services Department, Architectural Services Department, Water Services Department and other departments/companies.

ii. The Project proponent will ensure there will be no sand lost during the cable installation works here. The beach will be photographed prior to the commencement of the works (and after the restoration of the site) in order to assure the beach will be reinstated to the pre-works conditions.

iii. Legible notices will be put on site to show the commencement and completion dates of the land and shore-end works, daily working hours and emergency contact person and number.

<u>Land and Shore-End Cable Installation Period</u>

iv. On shore, the work area will be clearly demarcated using warning tape/ markers and marshals, and fenced off with barriers to ensure the public are kept clear. The fencing/ demarcation should be designed with amenity to minimise the impact on the beach during cable installation of the Project.

v. Security guards will stay overnight on site and ensure the public remains at a safe distance and outside the general works area. On land, the open section of trench will be clearly demarcated by means of warning tape and lights. In the shallows and offshore, marshals will also ensure the public remains clear of the works area e.g. for night time/ early morning swimmers.

vi. Trenching works will take place during the day-time period, ie 09:00 am to 6:00 pm, and restricted to weekdays, ie Monday to Friday. Security guards will stay overnight on site and the open section of trench will be clearly demarcated by means of warning tape and lights.

vii. The Contractor should comply with conditions stipulated by LCSD for works within the gazetted beach.

viii. No works would be conducted during bathing season (1st April to 30th October) within the boundary of gazetted beach.

ix. Excavation works will take place during the day-time period, ie 09:00 am to 6:00 pm, and restricted to weekdays, ie Monday to Friday. Security guards will stay overnight on site and the open section of excavation will be clearly demarcated by means of warning tape and lights.

x. Excavation works between HWM and Low Water Mark (LWM) will only be carried out during low tide.

xi. The machinery employed will be inspected prior to work commencing on the beach then at least daily thereafter to ensure the waters and beach will not be polluted with oil/grease/fuel. Oil absorbent materials will be readily placed on site and will be applied immediately should any oil leakage incidents to make sure the swimming zone will not be affected.

xii. The cables will be protected by concrete surrounded duct block, concrete cable trough or other suitable means in order to prevent the public from touching the cable directly.

Other Precautionary Measures associated with Shore-End Cable Installation by Diver

xiii. All diver hand jetting works will be conducted within silt curtain works area to provide protection to surrounding water from sediment. A silt curtain will also be set up at the water line for land based works to provide further protect from sediments possibly dispersing into the nearby water.

Other Information to be referred to for Site Inspection

xiv. The EIA and EM&A recommendations on environmental protection and pollution control mitigation measures (including e.g. dust control measures and good site practice measures for ecological impact);

xv. Ongoing results of the EM&A programme;

xvi. Work progress and programme;

xvii. Individual work methodology proposals (which shall include proposal on associated pollution control measures);

xviii. Contract specifications on environmental protection;

xix. Relevant environmental protection and pollution control laws; and

xx. Previous site inspection results undertaken by the ET and others.

The Contractor should keep the ET Leader updated with all relevant information on the construction contract necessary for him / her to carry out the site inspections. Inspection results and associated recommendations for improvements to the environmental protection and pollution control works should be submitted to the IEC and the Contractor within 24 hours for reference and for taking immediate action. The Contractor should follow the procedures and time-frame as stipulated in the

deficiency and action reporting system formulated by the ET Leader to report on any remedial measures subsequent to the site inspections.

The ET should also carry out ad hoc site inspections if significant environmental problems are identified. Inspections may also be required subsequent to receipt of environmental complaint, or as part of the investigation work, as specified in the Action Plan for environmental monitoring and audit.

11.2 Compliance with Legal and Contractual Requirements

There are contractual environmental protection and pollution control requirements as well as environmental protection and pollution control laws in Hong Kong with which construction activities must comply.

In order to ensure that the works are undertaken in compliance with the contractual requirements on environmental aspects, all works method statements submitted by the Contractor to the ER for approval should be sent to the ET Leader for vetting to see whether sufficient environmental protection and pollution control measures have been included. The implementation schedule of mitigation measures is summarised in **Appendix A**.

The ET Leader should also review the progress and programme of the works to check that relevant environmental laws have not been violated, and that any foreseeable potential for violating laws could be prevented.

The Contractor should regularly copy relevant documents to the ET Leader so that works checking could be carried out. The document should at least include the updated Works Progress Reports, updated Works Programme, any application letters for different licence / permits under the environmental protection laws, and copies of all valid licences/ permits. The site diary should also be available for the ET Leader's inspection upon his / her request.

After reviewing the documentation, the ET Leader should advise the IEC and the Contractor of any non-compliance with contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the ET Leader's review concludes that the current status on licence / permit application and any environmental protection and pollution control preparation works may result in potential violation of environmental protection and pollution control requirements, he / she should also advise the Contractor and the ER accordingly.

Upon receipt of the advice, the Contractor should undertake immediate action to correct the situation. The ER should follow up to ensure that appropriate action has been taken to satisfy contractual and legal requirements.

11.3 Environmental Complaints

Complaints should be referred to the ET Leader for action. The ET Leader should undertake the following procedures upon receipt of any complaint:

i. log complaint and date of receipt onto the complaint database and inform the IEC immediately;

ii. investigate the complaint to determine its validity, and assess whether the source of the problem is due to works activities;

iii. identify mitigation measures in consultation with the IEC if a complaint is valid and due to works;

iv. advise the Contractor if mitigation measures are required;

v. review the Contractor's response on the identified mitigation measure(s) and the updated situation;

vi. if the complaint is transferred from the EPD, submit interim report to the EPD on status of the complaint investigation and follow-up action within the time frame assigned by the EPD;

vii. undertake additional monitoring and audit to verify the situation if necessary, and review that circumstances leading to the complaint do not recur;

viii. report investigation results and subsequent actions to complainant (if the source of complaint is EPD, the results should be reported within the timeframe assigned by the EPD); and

ix. record the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports.

A flowchart indicating the complaint handling procedures is presented in **Figure 11.1**.

12. REPORTING

12.1 General

The EM&A reporting shall be carried out in paper based plus electronic submission upon agreeing the format with the ER and EPD. All the monitoring data (baseline and impact) shall also be made available through a dedicated internet website that would be agreed with relevant authority.

Types of reports that the ET Leader should prepare and submit include baseline monitoring report, monthly EM&A report and post project monitoring report. In accordance with Annex 21 of the EIAO-TM, a copy of the monthly EM&A report should be made available to the Director of Environmental Protection.

12.2 Baseline Monitoring Report

The ET Leader should prepare and submit a Baseline Environmental Monitoring Report within 10 working days of completion of the baseline monitoring. Copies of the Baseline Environmental Monitoring Report should be submitted to the Contractor, the IEC, the ER and the EPD. The ET Leader should liaise with the relevant parties on the exact number of copies they require. The report format and baseline monitoring data format should be agreed with the EPD prior to submission.

The baseline monitoring report should include at least the followings:

i. up to half a page executive summary;

ii. brief project background information;

iii. drawings showing locations of the baseline monitoring stations;

iv. monitoring results (in both hard and soft copies) together with the following information:

- monitoring methodology;
- types of equipment used and calibration details;
- parameters monitored;
- monitoring locations;
- monitoring date, time, frequency and duration; and
- quality assurance (QA) / quality control (QC) results and detection limits;

v. details of influencing factors, including:

- major activities, if any, being carried out on the site during the period;
- weather conditions during the period; and
- other factors which might affect results;

vi. determination of the action and limit levels for each monitoring parameter and statistical analysis of the baseline data, the analysis should conclude if there is any significant difference between control and impact stations for the parameters monitored;

vii. revisions for inclusion in the EM&A Manual; and

viii. comments, recommendations and conclusions.

12.3 Monthly EM&A Reports

12.3.1 Introduction

The results and findings of all EM&A work required in the Manual should be recorded in the monthly EM&A reports prepared by the ET Leader. The EM&A report should be prepared and submitted within 10 working days of the end of each reporting month, with the first report due the month after construction commences. Each monthly EM&A report should be submitted to the following parties: the Contractor, the IEC, the ER and the EPD. Before submission of the first EM&A report, the ET Leader should liaise with the parties on the required number of copies and format of the monthly reports in both hard copy and electronic medium.

The ET leader should review the number and location of monitoring stations and parameters every six months, or on as needed basis, in order to cater for any changes in the surrounding environment and the nature of works in progress.

12.3.2 First Monthly EM&A Report

The first monthly EM&A report should include at least the following:

i. executive summary (1-2 pages):
   - breaches of Action and Limit levels;
   - complaint log;
   - notifications of any summons and successful prosecutions;
   - reporting changes; and
   - future key issues.

ii. basic project information:
   - project organisation including key personnel contact names and telephone numbers;
   - construction programme;
   - management structure; and
   - works undertaken during the month.

iii. environmental status:
   - works undertaken during the month with illustrations (such as location of works); and
   - drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations (with co-ordinates of the monitoring locations).

iv. a brief summary of EM&A requirements including:
   - all monitoring parameters;
   - environmental quality performance limits (Action and Limit levels);
   - Event-Action Plans;
   - environmental mitigation measures, as recommended in the project EIA Final Report; and
   - environmental requirements in contract documents.

v. implementation status:

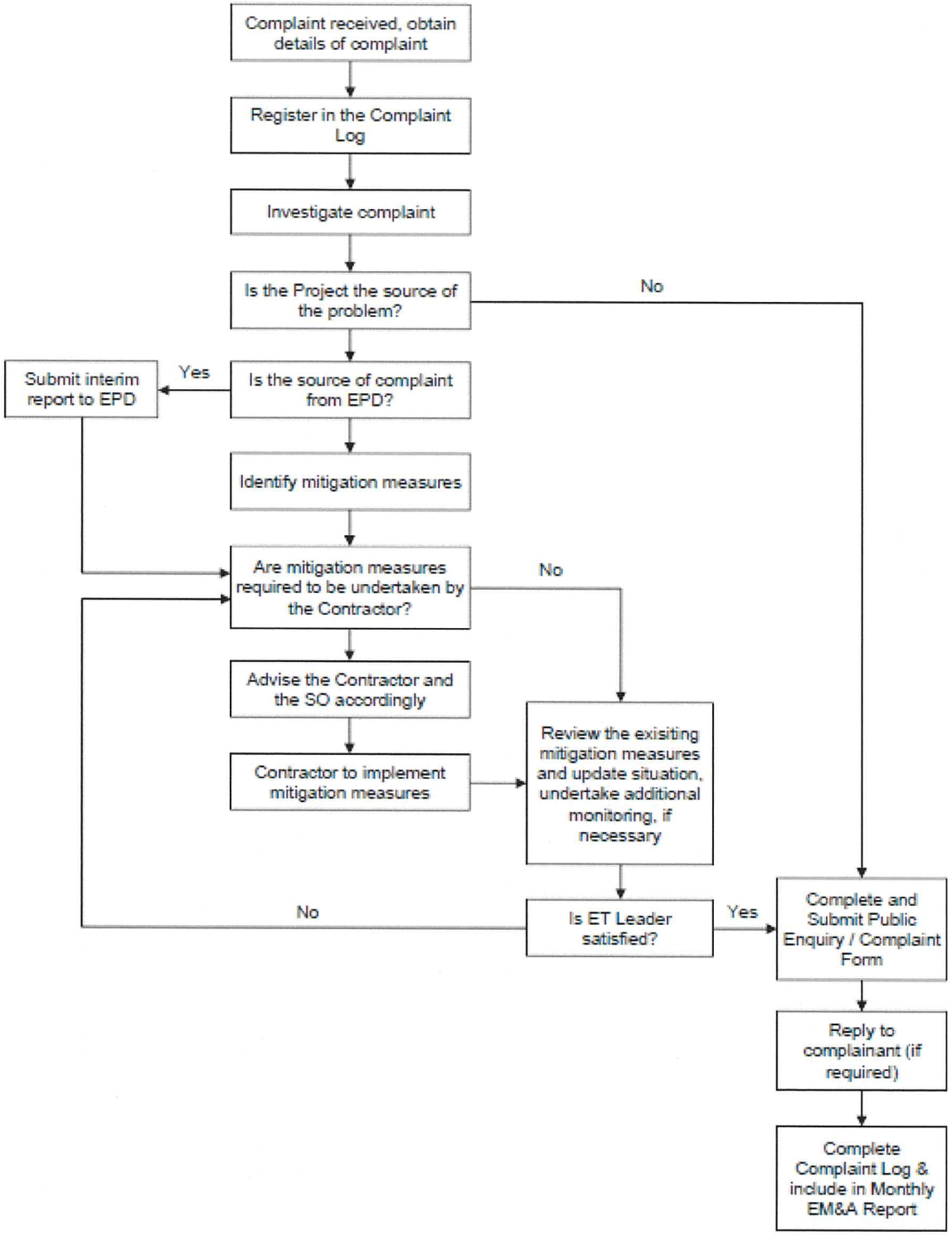

Figure 11.1

Environmental Complaint Flow Diagram

Environmental Resources Management

ERM

- advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the project EIA Final Report.

vi. monitoring results (in both hard and soft copies) together with the following information:

- monitoring methodology;
- name of types of equipment used and calibration details;
- parameters monitored;
- monitoring locations;
- monitoring date, time, frequency, and duration;
- weather conditions during the period;
- any other factors which might affect the monitoring results; and
- QA/QC results and detection limits.

vii. report on non-compliance, complaints, and notifications of summons and successful prosecutions:

- record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
- record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
- record of all notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
- review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
- description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.

viii. others

- an account of the future key issues as reviewed from the works programme and work method statements;
- advice on the solid and liquid waste management status; and
- comments (for examples, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

12.3.3 Subsequent Monthly EM&A Reports

Subsequent monthly EM&A reports should include the following:

i. executive summary (1 - 2 pages):

- breaches of Action and Limit levels;
- complaints log;
- notifications of any summons and successful prosecutions;
- reporting changes; and
- future key issues.

ii. environmental status:

- works undertaken during the month with illustrations (such as location of works etc.); and
- drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.

iii. implementation status:

- advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the project EIA.

iv. monitoring results (in both hard and soft copies) together with the following information:

- monitoring methodology;
- name of types of equipment used and calibration details;
- parameters monitored;
- monitoring locations;
- monitoring date, time, frequency, and duration;
- weather conditions during the period;
- any other factors which might affect the monitoring results; and
- QA / QC results and detection limits.

v. report on non-compliance, complaints, and notifications of summons and successful prosecutions:

- record of all non-compliance (exceedances) of the environmental quality performance limits (action and limit levels);
- record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
- record of all notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
- review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
- description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.

vi. others

- an account of the future key issues as reviewed from the works programme and work method statements;
- advice on the solid and liquid waste management status; and
- comments (for examples, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

vii. appendix

- action and limit levels;
- graphical plots of trends of monitored parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following:

- major activities being carried out on site during the period;
- weather conditions during the period; and
- any other factors that might affect the monitoring results.
- monitoring schedule for the present and next reporting period;
- cumulative statistics on complaints, notifications of summons and successful prosecutions; and
- outstanding issues and deficiencies.

12.4 Post Project Monitoring Report

The ET Leader should prepare and submit a Post Project Monitoring Report within 10 working days following the completion of the post-project monitoring. Copies of the Post Project Monitoring Report should be submitted to the Contractor, the IEC, the ER and the EPD.

The post project monitoring report should include at least the followings:

ix. up to half a page executive summary;

x. brief project background information;

xi. drawings showing locations of the post project monitoring stations;

xii. monitoring results (in both hard and soft copies) together with the following information:

- monitoring methodology;
- types of equipment used and calibration details;
- parameters monitored;
- monitoring locations;
- monitoring date, time, frequency and duration; and
- quality assurance (QA) / quality control (QC) results and detection limits;

xiii. details of influencing factors, including:

- major activities, if any, being carried out on the site during the period;
- weather conditions during the period; and
- other factors which might affect results; and

xiv. comments and conclusions.

12.5 Data Keeping

No site-based documents (such as monitoring field records, laboratory analysis records, site inspection forms, etc.) are required to be included in the monthly EM&A reports. However, any such document should be well kept by the ET Leader and be ready for inspection upon request. All relevant information should be clearly and systematically recorded in the document. Monitoring data should also be recorded in magnetic media form, and the software copy must be available upon request. Data format should be agreed with EPD. All documents and data should be kept for at least one year following completion of the construction contract.

12.6 Interim Notifications of Environmental Quality Limit Exceedances

With reference to the Event and Action Plan, when the environmental quality performance limits are exceeded, the ET Leader should immediately notify the IEC and EPD, as appropriate. The notification should be followed up with advice to IEC and EPD on the results of the investigation,

proposed actions and success of the actions taken, with any necessary follow-up proposals. A sample template for the interim notifications is presented in **Appendix C**.

APPENDIX A IMPLEMENTATION SCHEDULE OF THE PROPOSED MITIGATION MEASURES

Table 1.1 Implementation Schedule for Water Quality Measures for the Installation of Submarine Cable

EIA / ERR Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
				Des	C	O	Dec	
EIA S5b.8.1.1	<u>Drainage and Construction Site Runoff</u> The site practices outlined in ProPECC PN 1/94 "Construction Site Drainage" should be followed as far as practicable in order to minimise surface runoff and the chance of erosion. These practices include the following items: • At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented. Channels (both temporary and permanent drainage pipes and culverts), earth bunds or sand bag barriers should be provided on site to direct storm water to silt removal facilities. The design of the temporary on-site drainage system will be undertaken by the contractor prior to the commencement of construction. • Boundaries of earthworks should be surrounded by dykes or embankments for flood protection, as necessary. • Sand/silt removal facilities such as sand/silt traps and sediment basins should be provided to remove sand/silt particles from runoff to meet the requirements of the TM-DSS. The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 1/94, which states that the retention time for silt/sand traps should be 5 minutes under maximum flow conditions. The detailed design of the sand/silt traps shall be undertaken by the contractor prior to the commencement of construction. • Measures should be taken to minimize the ingress of site runoff and drainage into excavations. Drainage water pumped out from excavations should be discharged into storm drains via silt removal facilities. • Runoff and drainage into excavations. Drainage water pumped out from excavations should be discharged into storm drains via silt removal facilities. • During rainstorms, exposed slope/soil surfaces should be covered by a tarpaulin or other means, as far as practicable. Other measures that need to be implemented before, during and after rainstorms are summarized in ProPECC PN 1/94. • Exposed soil areas should be minimized to reduce potential for increased siltation and contamination of runoff. • Earthwork final surfaces should be well compacted and subsequent permanent work or surface protection should be immediately performed. • Open stockpiles of construction materials or construction wastes on-site should be covered with tarpaulin or similar fabric during rainstorms.	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO
EIA S5b.8.1.2	<u>General Construction Activities</u> Construction solid waste should be collected, handled and disposed of properly to avoid entering to the nearby watercourses and public drainage system. Rubbish and litter from construction sites should also be collected to prevent spreading of rubbish and litter from the site area. It is recommended to clean the construction sites on a regular basis.	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO
EIA S5b.8.1.4	<u>Accidental Spillage</u> Contractor must register as a chemical waste producer if chemical wastes would be produced from construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes.	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO

EIA S5b.8.1.5	Maintenance of vehicles and equipments involving activities with potential for leakage and spillage should only be undertaken within the areas which appropriately equipped to control these discharges.	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO
EIA S5b.8.1.6	Oils and fuels should only be used and stored in designated areas which have pollution prevention facilities. All fuel tanks and storage areas should be sited on sealed areas in order to prevent spillage of fuels and solvents to the nearby watercourses. All waste oils and fuels should be collected in designated tanks prior to disposal.	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO
EIA S5b.8.1.7	Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published under the Waste Disposal Ordinance details the requirements to deal with chemical wastes. General requirements are given as follows: • Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport. • Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents.	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO
ERR S3.1.1.1	<u>Works within the Gazetted Boundary of Upper Cheung Sha Beach (UCSB)</u> • No construction work would be conducted in the bathing season of April to October. • Section of cable from low water mark to 80 m outside of the gazetted boundary would be installed by diver using hand held water jet. • The machinery employed will be inspected prior to work commencing on the beach then at least daily thereafter to ensure the waters and beach will not be polluted with oil/ grease/ fuel. No machinery maintenance will be carried out onsite. Oil absorbent materials will be readily placed on site and will be applied immediately should any oil leakage incidents occur, to ensure the swimming zone would not be affected. • The section of cable between low water mark and 80m outside the boundary of the UCSB shall be installed by divers using hand held water jet. • Silt curtains shall be deployed to fully enclose the hand held jetting works within the boundary of the UCSB and be deployed at the water line surrounding the works area to prevent runoff from land-based works on the UCSB. • The forward speed of the cable installation barge will be limited to a maximum of 1 km hr^{-1}.	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO

* Des - Design, C - Construction, O – Operation, and Dec – Decommissioning

Table 1.2 Implementation Schedule for Waste Mitigation Measures for the Installation of Submarine Cable

EIA / ERR Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
				Des	C	O	Dec	
EIA 6b.5.1.2	Good Site Practices Adverse environmental impacts in relation to waste management are not expected, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities would include: • Obtain relevant waste disposal permits from appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354) and subsidiary Regulations and the Land (Miscellaneous Provisions) Ordinance (Cap. 28); • Provide staff training for proper waste management and chemical handling procedures; • Provide sufficient waste disposal points and regular waste collection; • Provide appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; and • Carry out regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors; • Separate chemical wastes for special handling and disposed of to licensed facility for treatment; and • Employ licensed waste collector to collect waste.	Work Site/ During Construction Period	Contractor		✓			WDO; LDO; ETWB TCW No. 19/2005; EIAO-TM
EIA 6b.5.1.13	Chemical Wastes Should chemical wastes be produced at the construction site, the Contractor would be required to register with EPD as a Chemical Waste Producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste (such as explosive, flammable, oxidizing, irritant, toxic, harmful, or corrosive). The Contractor should employ a licensed collector to transport and dispose of the chemical wastes, to either the Chemical Waste Treatment Centre at Tsing Yi, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.	Work Site/ During Design & Construction Period	Contractor		✓			Waste Disposal (Chemical Waste) (General) Regulation
EIA 6b.5.1.14	General Refuse General refuse should be stored in enclosed bins or compaction units separate from Construction & Demolition (C&D) materials. A licensed waste collector should be employed by the Contractor to remove general refuse from the site, separately from C&D materials. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind blown' light material.	Work Site/ During Construction Period	Contractor		✓			Public Health and Municipal Services Ordinance

* Des - Design, C - Construction, O – Operation, and Dec – Decommissioning

Table 1.3 Implementation Schedule for Ecological Mitigation Measures for the Installation of Submarine Cable

EIA / ERR Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
				Des	C	O	Dec	
EIA 7b.8.3.16 - 7b.8.3.30	Measures to minimise disturbance on Finless Porpoise *Monitored exclusion zones* • During submarine cable installation/ repair operation works, a monitored marine mammal exclusion zone of 250 m radius from the cable installation/ repair vessel should be implemented. The exclusion zone should be closely monitored by an experienced marine mammal observer at least 30 minutes before the start of cable installation/ repair works. If a marine mammal is noted within the exclusion zone, all marine works should stop immediately and remain idle for 30 minutes, or until the exclusion zone is free from marine mammals. • The experienced marine mammal observer should be well trained to detect marine mammals. Binoculars should be used to search the exclusion zone from an elevated platform with unobstructed visibility. The observer should also be independent from the project proponent and has the power to call-off construction activities. • In addition, as marine mammals cannot be effectively monitored within the proposed monitored exclusion zone at night, or during adverse weather conditions (i.e. Beaufort 5 or above, visibility of 300 meters or below), marine works should be avoided under weather conditions with low visibility. *Vessel speed limit* • The frequent vessel traffic in the vicinity of works area may increase the chance of mammal mammals being killed or seriously injured by vessel collision. A speed limit of ten knots should be strictly enforced within areas with high density of Finless Porpoise.	Work site, marine traffic route	Contractor		✓			EIAO-TM; Supporting Document for Application for Further Environmental Permit (FEP-02/429/2012/B)

* Des - Design, C - Construction, O – Operation, and Dec – Decommissioning

APPENDIX B WATER QUALITY MONITORING DATA RECORD SHEET

Water Quality Monitoring Data Record Sheet

Monitoring Station		
Date		
Weather Condition		
Sea Condition		
Tide Mode		
Start Time (hh:mm)		
Water Depth which sample is collected (m)		
pH		
Temperature (oC)		
Salinity (ppt)		
Turbidity (NTU)		
Sample Identification		
Suspended Solids (mg/l)		
DO (mg/l)		
DO Saturation (%)		
Remarks / Other Observations		

Name & Designation Signature Date

Recorded by:

Checked by:

Laboratory Staff:

Notes:
1 The SS results are to be entered once they are available from the laboratory.
2 *In-situ* measurements shall be deployed at the designated location twice. The difference between the two consecutive measurements shall be within the range of 25%. If the difference is larger than 25%, the measurement shall be carried out again until the two consecutive readings agree to within 25%.

APPENDIX C INCIDENT REPORT ON ACTION LEVEL OR LIMIT LEVEL NON-COMPLIANCE

Incident Report on Action Level or Limit Level Non-compliance

Project	
Date	
Time	
Monitoring Location	
Parameter	
Action & Limit Levels	
Measurement Level	
Possible reason for Action or Limit Level Noncompliance	
Actions taken / to be taken	
Remarks	

Prepared by: _____

Designation: _____

Signature: _____

Date: _____

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